

Skills for green jobs  
Technical validation workshop

Skills for green jobs: Brazilian case  
Occupational change in Brazil  
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What are the main drivers of change that affect skills needs for greener economy?

First driver: environmental legislation (national and international level)

- “... the air and waters surrounding us cannot readily be fenced, and so the tragedy of the commons as a cesspool must be prevented by different means, by coercive laws or taxing devices that make it cheaper for the polluter to treat his pollutants than to discharge them untreated.” (Hardin, 1968)
- “A public good has two critical properties: nonrivalrous consumption (the consumption of one individual does not detract from that of another) and nonexcludability (it is difficult if not impossible to exclude an individual from enjoying the good).” (Stiglitz, 1999)
- Brazil is in transition from a carbon economy to a low carbon economy.

First driver: environmental legislation (national and international level)

- In Brazil, environmental legislation is the main driver that directs and organizes the process of transition to a low carbon economy (National Plan on Climate Change; Incentive for Alternative Sources of Energy Program; Biofuels Program; National Alcohol Program; National Forest Policy; National Water Resources Plan; National Policy on Solid Waste etc).
- Some environmental legislation impacts on the jobs are direct (control and inspection of the legislation) and other are indirect (companies have to adapt procedures, routines and technologies and them skills have to be modified).

## Second driver: technological innovation

Predominantly, at this transition, most economic activities use end-of-pipe technology (which reduces environmental impacts) and some cleaner technologies (whose emissions, or water and soil contamination are considered acceptable at present).

Mostly greening existing occupations

According to specialists interviewed during the project the most important cleaner technologies will be based on nanotechnology and biotechnology.

New green occupations

Are newly emerging occupations more frequent in developing and high-growth emerging economies?

In Brazilian case we identify two main new green occupations:

- Designer of eco-conception vehicle
- Recycling specialist

Is still low the process of diffusion of these occupations in the Brazilian economic activities.

Is lowest the process of diffusion of the new occupations related to nanotechnology and biotechnology.

Are there differences between countries  
in the level of qualifications for changing  
and emerging green occupations?



## **There are some important differences:**

a) Variation in the economics activities with great opportunities of mitigation in order to identify a potential of adopting technologies end-of-pipe. In Brazilian case we utilized the Brazilian inventory of antropics emissions:

- Energy Sector
- Transport Sector
- Construction Sector
- Agricultural Sector
- Forestry/Forests Sector
- Waste Sector
- Steel Sector

b) Variation on the occupations that could be impacted by the diffusion of end-of-pipe technologies

- In Brazilian case we selected some economic activities that have been named at the Mackinsey report (2008).
- The McKinsey report identifies a **range of technologies** as having greater opportunities for mitigation.
- Based on this list of economic activities and end-of-pipe technologies, we **consulted specialists** on the occupations that could suffer the impacts resulted from the diffusion of such technologies.
- Finally we identified a list of occupations.
- The Brazilian list of occupations could differ from other country for many reasons: degree of opportunities of mitigation; level of qualification and occupational structure.

c) Differences between what employers, works and government consider green economic activities. In Brazilian case the consultation of the worker's representative agency, the employer's representative agency and the government agency revealed that there is no common perception about what they consider green economic activities.

- Economic activities associated with the generation, transmission and distribution of cleaner energy; ex: generation, transmission and distribution of electric energy, manufacturers of equipments for distribution and control of electrical energy
- Economic activities related to environmental quality; cleaning and distributing water, activities in botanic and zoological gardens, national parks.
- Economic activities to avoid costs; ex: treatment and disposal of waste (dangerous or not), recycling metallic, plastic and other materials; maintenance of vehicles.
- Economic activities associated with fuels based on renewable sources; ethanol or biofuels
- Economic activities associated with changes in transport matrix; manufacture locomotives, wagons and other rail material, bicycles and rail cargos.
- Economic activities associated with sequestration of carbon dioxide; forest production – reforest process, production of seeds and seedling, as well as other forms of certified vegetal propagation.

- Over the next 5 years cleaner energy, fuels based on renewable sources and recycling sector will growth above the average growth of the economy.
- There are some main occupational groups that will growth more than the average.
- The occupational group jobs generated by the growth of green economic activities may be filled by different types of workers, among them those displaced from occupations that were or will be affected by the end-of-pipe technologies diffusion. The occupational groups that present occupational mobility standards equivalent in the labor market or share the same set of knowledge, abilities, and aptitudes could be prioritized in this training process.
- This process is quite different between countries.

Muito obrigado!  
Thank you very much!